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ABSTRACT

This study investigates the longitudinal effects of preschool experience, Parent Education Follow Through (PEFTP) experience, and sex on academic achievement. A total of 293 children forming three cohorts from schools in two communities were included. Cohort 1 comprised grade 3 to 5 children; Cohort 2 comprised grade 1 to 4 children; and Cohort 3 comprised grade 2 to 5 children. Total reading, total language, and total mathematics scale scores on the Comprehensive Test of Basic Skills (CTBS) were collected for each child and used as the dependent variable in all statistical anlaysis. A repeated measure design using multivariate analysis of variance was used to analyze the data. The results suggest that by the third grade all PEFTP children perform equally well on achievement measures regardless of preschool experience. No substantial sex effect was discovered. Achievement of children in this program was comparable to that of the CTBS norm group in the areas of reading, language, and mathematics. (Author/MP)

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The Impact of Preschool Experience and the Parent Education Follow Through Program on Academic Achievement: A Longitudinal Study Through Grade 5.

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The Impact of Preschool Experience and the Parent Education Follow Through Program on Academic Achievement: A Longitudinal Study Through Grade 5.

Introduction

The Follow Through project was begun in the 1960s as an effort to extend preschool compensatory education projects (namely, Head Start) into the public schools. The assumption on which the project was based was that the gains that a child might experience by participating in a preschool program such as Head Start could be maintained or enhanced by offering the child enriched educational experiences after s/he had entered school (literally following through with preschool gains). At the inception of the Follow Through project, the assumption that preschool and Follow Through experiences were linked was speculative. Since that time, considerable evidence has been collected that supports the Follow Through Project (Gordon, 1978; House, Glass, McLean and Walker, 1977; Stebbins, St. Pierre, Proper, Anderson and Cerva, 1977), but the relationship between preschool experience and Follow Through has remained unclear. It is the purpose of this study to explore the relationship that exists between these two types of programs by examining the long-term achievement gains of children with both preschool and Follow Through experience as compared to children with Follow Through experience alone.

Parent Education Follow Through Program

Follow Through is a large-scale project comprised of 22 separate models. One such model is the Parent Education Follow Through Program (PEFTP). Since the data for this study were obtained from communities currently implementing this program, a brief descriptive model will follow.

PEFTP is an educational program that serves children in public schools from grades K-3. An assumption that is basic to the PEFTP is that the parent is the first and most important teacher of his/her child. The focus of the model, therefore, is not on the child, school or teacher. Instead, the model has as its major point of emphasis the home and the home-school relationship. Such an emphasis can be seen in the project's efforts to modify home variables so that they might be more conducive to the child's achievement (i.e. instructing the parent in how to effectively teach his/her child, helping the parent create a positive learning environment in the home, etc.). It is also evident in PEFTP efforts to help the schools accommodate to the needs of the parents. To this end, PEFTP parents are encouraged to participate in their community in various capacities or roles. The specific roles developed by PEFTP include those of the parent as learner, recipient of information (such as comprehensive services), classroom volunteer, decision maker within PEFTP, teacher of his/her own children and paid paraprofessional in the schools. Pariticipation in one or more of these roles is encouraged under the assumption that if the parent can learn to see him/herself as a teacher, an active learner and as a functional and influential member of the community, then the child will be given a positive and more powerful learning model that s/he may emulate.

Review of Literature

Perusal of the literature pertaining to early childhood education programs for preschool and school age children reveals a large portion of information concerning Head Start. Early evaluations of Head Start showed that the program benefited children in several respects (Haney, 1977). Although this preschool program helped children, several studies were completed which suggested that the positive effects of Head Start dissipated soon after children left the program (Westinghouse, 1969).

The major evaluation of Head Start (Westinghouse, 1969), made three determinations: one, less benefit was derived by children who entered late in the Head Start program; two, children's gains lasted longer if their parents actively participated in the program; and three, the gains made by these children were diminished once they left the program.

Another study which investigated the follow-up effects of Head Start was completed by Max Wolff and Annie Stein (1966). They studied the kindergarten status of Head Start children. Wolff and Stein (1966) found no significant difference on the Bettye Caldwell Pre-School Inventory between the Head Start children and the kindergarten children without Head Start experience. This study also reported that the parents of the Head Start children were very supportive of the Head Start Program.

It would seem reasonable to assume that PEFTP, with its emphasis on parental involvement, would certainly have great potential for sustaining gains associated with preschool experiences. Also, the impact of PEFTP itself would be augmented by such preschool education experiences.

Evidence supporting this assumption can be found in a study by Revicki and Rubin (1979) in which achievement scores of PEFTP children were examined both while the children were involved in the program and one year after graduation from the program. Scores were compared on the basis of whether or not the Follow Through children had had preschool education experience. Results of this study indicated that children with preschool education experience performed significantly better on tests of math achievement than did PEFTP children without this experiemce. There was also a nonsignificant trend for PEFTP children with preschool education to perform better than the "no preschool" group in the area of reading achievement.

It is the purpose of this study to extend and clarify these findings by examining achievement scores of PEFTP children who have been tracked longitudinally as far as the fifth grade. This investigation was designed to determine

the effects that preschool experience and the PEFTP have on academic achievement during the course of the program, as well as two years after graduation from the PEFTP. In addition, the study will investigate any sex effects present in the achievement test performance of the children.

Sample

Three cohorts of Parent Education Follow Through Program children were included in the study. Table 1 includes information on each cohort of children. Cohort 1 contains 69 children from Community A tracked longitudinally from grade 3 to grade 5. Community A is an urban, predominantly black community located in the Southeast. Posttest scores for the 127 children were collected from the 1976-77 academic year when they were in the third grade until the 1978-79 academic year when they were in the fifth grade.

Cohort 2 and Cohort 3 contain 120 and 104 children, respectively. Both cohorts come from Community B, which is a rural, predominantly black Southeastern community. Cohort 2 contains children tracked longitudinally from the 1975-76 academic year when they were in the first grade until 1978-79 when they were in the fourth grade. Posttest scores were located for each child included in the group.

Cohort 3 contains children tracked longitudinally from the 1975-76 academic year when they were in the second grade until 1978-79 when they were in the fifth grade. Posttest scores were located for each child included in the group.

Judging from the size of the sample and the characteristics of Community B, it is reasonable to conclude that few of the students were lost due to attrition. In the case of Community A, at least 33% of the students have complete data files tracked longitudi ally. Mean comparisons between the children included in this study and the entire program group for each grade indicate that no serious differences exist between the groups in terms of sex, ethnicity, preschool and achievement variables.

Instruments

The Comprehensive Test of Basic Skills (CTBS), 1973 Edition was administered in the spring of each school year in both Community A and Community B. The forms and levels of the CTBS administered in each Community and grade are indicated in Table 2. Total Reading, Total Language and Total Mathematics scale scores were used as the dependent variables in all statistical analyses. Information regarding the presence or absence of preschool experience and the sex variables was recorded upon initial participation in the Parent Education Follow Through Program.

Statistical Analysis

The design of the study can be considered a three factor with repeated measures on one factor design (Winer, 1971). The factors of interest are: (1) preschool versus no preschool experience, (2) sex, and (3) grade level. Therefore, there are four groups of interest tested at three to four intervals: (1) males with preschool experience, (2) females with no preschool experience, (3) males with no preschool experience, and (4) females with no preschool experience. The study is quasiexperimental in nature since no control was exercised over assignment to preschool experience; that is, intact, preexisting groups were selected for study.

The statistical procedure outlined by McCall and Appelbaum (1973) for analyzing data from repeated measures design utilizing Multivariate analysis of variance was used to analyze the data. All computations were performed by using SAS GLM procedures (SAS, 1979). The achievement data for each cohort of children were analyzed separately and will be reported separately.

Results

Descriptive statistics for the total reading, total language and total mathematics scores for each cohort are included in Tables 3-5. The results of the nine MANOVAs for repeated measures for the total reading, total language and total mathematics scale scores are reproduced in Tables 6-14. The results of the analyses for scale scores within each cohort will be reported separately,

beginning with Community A, Cohort 1.

Community A, Cohort 1

The results of the MANOVAs for the total reading, total language and total mathematics scale scores are reproduced in Tables 6-8, respectively. Descriptive statistics are included in Table 3.

The results of the MANOVA performed on the total reading scores indicate no significant preschool effects ($p > .05$) or sex effects ($p > .05$). Likewise, the interaction of preschool experience and sex was nonsignificant ($p > .05$). Similarly, statistical tests of the within subjects effects resulted in no significant effects ($p > .05$). The profile of mean total reading scores for the four groups of interest are depicted in Figure 1. No clearly discernible pattern can be observed among the mean total reading scores.

The results of the MANOVA performed on the total language scores suggest no significant preschool effects ($p > .05$) or sex effects ($p > .05$). Similarly, the interaction between preschool experience and sex was found to be nonsignificant ($p > .05$). The statistical tests of the within subjects effects resulted in no significant effects ($p > .05$). Figure 2 contains the profile of mean total language scores for the four groups. Again no discernible pattern can be observed.

Results of the MANOVA conducted on the total mathematics are included in Table 8. No significant preschool or sex effects were discovered ($p > .05$). Likewise, the interaction between preschool experience and sex was nonsignificant ($p > .05$). However, the results indicate a significant sex effect over time ($p < .05$). Tests for trends, using orthogonal polynomial contrasts, suggested a significant linear trend ($p < .05$). It can be easily seen in Figure 3, that the males score higher than the females on total mathematics. It should be noted that the grade five total mathematics scores are very similar for the females in both groups and the males with no preschool experience. It appears that this observed sex difference is due primarily to the initial high scores of the males with no preschool experience.

Community B, Cohort 2

The results of the MANOVAs performed on the total reading, total language and total mathematics scale scores are presented in Tables 9-11, respectively. Descriptive statictics are included in Table 4.

The results of the MANOVA conducted on the total reading scores suggest no significant preschool experience effects ($p > .05$) or sex effects ($p > .05$). Likewise, the interaction between preschool experience and sex was not significant ($p > .05$). Similarly, the statistical tests of the within subjects effects resulted in no significant effects ($p > .05$). The profile of mean total reading scores for the four groups is represented in Figure 4. No clearly discernible pattern can be observed, save the remarkable resemblance in scores over time.

Results of the MANOVA performed on the total language scores are included in Table 10. No significant preschool effects ($p > .05$) or sex effects ($p > .05$) were discovered. Similarly, the interaction between sex and preschool experience was not significant ($p > .05$). The statistical tests of the within subjects effects resulted in a significant preschool by sex interaction over time ($p < .05$). Tests for trends, using orthogonal polynomial contrasts, suggested a significant linear trend ($p < .05$). Figure 5 depicts the profile of mean total language scores over time for the four groups of interest. It appears that females with no preschool and males with preschool experience begin with higher scores in grade one, but by grade three are surpassed by females with preschool and males with no preschool experience.

The results of the MANOVA performed on the total mathematics indicate no significant preschool effects ($p > .05$) or sex effects ($p > .05$). There was a marginally significant preschool by sex interaction detected ($p < .09$). It appears that females with preschool experience outperform males with preschool experience, while males with no preschool experience oupterform females with no preschool

experience. Statistical tests of the within subjects effects suggest a marginally significant preschool by sex interaction ($p < .08$). Subsequent tests for trends, using orthogonal polynomial contrasts, resulted in significant linear effect ($p < .05$). Figure 6 depicts the profile of mean total mathematics scores for the four groups. It is easily discerned that the females with preschool and the males with preschool experience begin with lower grade one scores and by grade two surpass the mathematics scores of the females with no preschool experience.

Community B, Cohort 3

The results of the MANOVAs for the total reading, total language, and total mathematics scale scores are represented in Tables 12-14. Descriptive statistics are included in Table 5.

The results of the MANOVA conducted on the total reading scores indicate no significant preschool effects ($p > .05$) or sex effects ($p > .05$). Likewise, the interaction of preschool experience and sex was nonsignificant ($p > .05$). Similarly, statistical tests of the within subjects effects resulted in no significant effects ($p > .05$). The profile of mean total reading scores for the four groups of interest is depicted in Figure 7. No clearly discernible pattern can be observed among the different groups' mean total reading scores.

Table 13 contains the results of the MANOVA performed on the total language scores. A marginally significant preschool effect was discovered ($p < .09$). Likewise, a significant sex effect was found ($p < .05$). No significant interaction between preschool experience and sex was found ($p > .05$). It appears that the total language scores of females were higher than those of males. Also, children with preschool experience outperformed those with no preschool experience. At least this is true of the females. Statistical tests of the within subjects effects indicated no significant results ($p > .05$). Figure 8 depicts the profile of mean total language scores for the groups.

The results of the MANOVA conducted on the total mathematics scores showed a significant preschool effect ($p < .05$). However, the sex effect and the sex by preschool experience interaction proved nonsignificant ($p > .05$). Inspection of the means in Table 5 indicates that those children with preschool experience had higher mathematics scores than their peers without preschool experience. The statistical tests of the within subjects effects suggested a significant sex effect ($p < .05$), with females, in general, outperforming males. Subsequent tests for trends, using orthogonal polynomial contrasts, resulted in a significant linear ($p < .05$) and quadratic effect ($p < .05$). Figure 9 depicts the profile of mean total mathematics scores for the groups of interest.

Conclusions

Several qualifications must be made before we continue with the discussion of our conclusions. One, is that the research reported here was conducted in only two of 10 Parent Education Follow Through Program communities. Therefore, it may apply only to conditions specific to those communities . The extent that these results are generalizable to other Parent Education Follow Through sites is dependent on further research.

Another qualification is related to the statistical analysis of factorial experiments involving repeated measures. Biases may be present in the ANOVA procedures depending on violations of assumptions regarding homogeneity of variance-covariance structure of the data. We attempted to avoid this problem by using the MANOVA procedures recommended by McCall and Appelbaum (1973). Since this statistical technique makes relatively few assumptions, there is the possibility that a subsequent loss of power in detecting differences may result.

For the most part, there was a plethora of nonsignificant results in the analysis of preschool and sex effects in total reading, total language and total

mathematics scores for the children in Community A, Cohort 1. It appears that by the third grade all PEFTP children perform equally well on measures of school achievement regardless of preschool experience. A similar conclusion can be made regarding sex effects, except in the area of mathematics achievement. It appears that males score higher than females from the third to fifth grades. However, it should be noted that the grade five total mathematics scores are very similar for females and the males with no preschool experience. The observed sex difference may be due entirely to the initial high scores of the males with no preschool experience. Comparisons of the PEFTP children with those of the CTBS norming sample are quite positive (see Figures 1-3). The PEFTP children perform similarly to those children involved in the CTBS norm sample on total reading, total mathematics and total language scores. This is very encouraging since it appears that these "at risk" children are sustaining their achievement gains at least until the fifth grade, two years after graduation from the program.

In Community B, Cohort 2 we found that all of the results were nonsignificant for both total reading and total language scores when we investigated overall between group differences on the factors preschool experience and sex. We did find a significant preschool by sex interaction over time on the total language scores. We found that females with no preschool experience and males with preschool experience began with higher scores in grade one, but by grade three they are surpassed by females with preschool experience.

For the mathematics scores, a marginally significant sex by preschool interaction was discovered. It appears that females with preschool experience outperform males with preschool experience. Just the opposite occurs for the groups without preschool experience; that is, males outperform females. Also, a marginally significant preschool by sex interaction was found over time. The females and males with preschool experience began with lower grade one mathematics

scores and by grade two surpass the mathematics scores of the females with no preschool experience.

Children participating in the PEFTP, for the most part, perform equally well on achievement measures, whether they have participated in preschool programs or not. It does appear that between grade one and four several complex preschool by sex interactions occur in the areas of language and mathematics achievement. Comparisons of the PEFTP children with those of the CTBS norming sample indicate that the program children are comparable to the norm group in mathematics until grade four (see Figure 6). Unfortunately, the comparisons in the area of reading and language achievement are not as encouraging (Figures 4 and 5). It appears that reading achievement scores of the PEFTP children are higher than those of the norm group in grade three, but this difference is reversed after the children leave the program.

The analysis of total reading scores for Community B, Cohort 3 resulted in no discernible sex or preschool effects. Likewise, no preschool or sex effects were discovered over time. A marginally significant preschool effect and a significant sex effect was found for language scores. The language scores of females were higher than those of males, and children with preschool experience outperformed those with no preschool experience. Preschool experience does seem to make a difference in language performance for children involved in the PEFTP.

Preschool experience was found to be significantly related to mathematics performance, with the children possessing preschool experience achieving higher scores. However, it was found that over time there was a significant sex effect, with females in general outperforming males. Comparisons of the PEFTP children with those of the CTBS norming sample are not very encouraging (see Figures 7-9). It appears that the PEFTP children are not achieving at levels comparable to the norming sample,, although this problem is less prevalent in mathematics achievement.

Although the program children are experiencing positive growth, there is a definite decrease in the amount of gain following graduation from the program. Similar results have been found by Ferb, Larson and Napior (1977).

Educational Significance

In summary, Follow Through was initiated in 1967 as a project for disadvantaged children from kindergarten through third grade. It was conceptualized as a comprehensive program offering educational, medical and dental, nutritional, social and psychological services to children previously enrolled in Head Start. Because of this focus and its eleven-year history, the lessons learned by Follow Through are worthy of examination.

It was the purpose of this research to study the concept of the Follow Through experience in combination with preschool experience. Comparisons of achievement scores of these "at risk" students to CTBS norms indicate that PEFTP does have a positive impact on the achievement performances of its participants.

Finally, comparisons of PEFTP children with preschool education experience to those without such experience generally yielded nonsignificant results. The consistency of these findings could be interpreted as support for the conclusion that PEFTP alone may provide educational services in combination with parent involvement that are sufficient to increase and maintain achievement gains for participating children.

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TABLE 1

Information on community, cohort, academic year and grade include in the longitudinal sample.

		1975-76	1976-77	1977-78	1978-79
Community A	Cohort 1:	-	Grade 3	Grade 4	Grade5
Community B	Cohort 2:	Grade 1	Grade 2	Grade 3	Grade 4
Community B	Cohort 3:	Grade 2	Grade 3	Grade 4	Grade 5

TABLE 2

Comprehensive test of Basic Skills forms and levels for each cohort and grade.

		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Community A	Cohort 1:			Form S, Level 1	Form S, Level 1	Form S, Level 2
Community B	Cohort 2:	Form S, Level B	Form S, Level C	Form S, Level 1	Form S, Level 1	
Community B	Cohort 3:		Form S, Level C	Form S, Level 1	Form S, Level 1	Form S, Level 2

TABLE 3

Descriptive statistics for total reading, total language and total mathematic scores on the CTBS, grades 3-5 Community A, Cohort 1, with Preschool experience and sex.

Preschool Sex	Preschool Male	Preschool Female	No Preschool Male	No Preschool Female
Grade	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)
Three (1977)				
Reading	349.00 (55.32)	368.39 (59.92)	375.86 (55.51)	357.87 (68.67)
Language	409.71 (125.69)	407.61 (58.71)	418.71 (48.11)	391.87 (92.42)
Mathematics	350.88 (35.10)	350.96 (40.99)	375.71 (51.79)	345.00 (48.94)
Four (1978)				
Reading	397.63 (60.96)	402.65 (41.90)	426.71 (79.22)	412.87 (69.94)
Language	423.75 (48.11)	454.57 (68.10)	439.43 (64.99)	451.79 (91.76)
Mathematics	386.29 (41.64)	389.78 (59.61)	402.57 (63.62)	385.47 (52.16)
Five (1979)				
Reading	426.79 (56.32)	424.39 (43.84)	438.57 (60.48)	438.20 (74.81)
Language	449.21 (56.59)	462.61 (52.37)	464.57 (66.79)	477.67 (79.72)
Mathematics	413.96 (58.35)	432.05 (43.84)	432.57 (79.35)	438.67 (49.76)
n	24	23	7	15

TABLE 4

Descriptive statistics for total reading, total language and total mathematic scores on the CTBS, grades 1-4 Community B, Cohort 2, with Preschool experience and sex.

Preschool Sex	Preschool Male	Preschool Female	No Preschool Male	No Preschool Female
Grade	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)
One (1976)				
Reading	242.78 (31.55)	248.63 (41.49)	252.38 (29.02)	244.33 (41.62)
Language	245.60 (30.69)	242.02 (44.80)	236.21 (37.85)	250.27 (45.09)
Mathematics	246.98 (26.86)	249.81 (32.99)	267.58 (30.94)	252.85 (35.46)
Two (1977)				
Reading	281.05 (57.99)	290.14 (56.88)	280.78 (64.54)	279.06 (61.04)
Language	323.75 (67.27)	331.86 (70.29)	323.75 (94.17)	326.49 (73.76)
Mathematics	321.78 (34.13)	311.37 (40.91)	323.13 (34.60)	317.46 (49.92)
Three (1978)				
Reading	387.38 (61.95)	394.23 (97.80)	430.46 (69.84)	400.30 (87.09)
Language	369.15 (34.87)	372.72 (47.09)	382.79 (45.33)	357.09 (40.79)
Mathematics	349.43 (32.82)	351.65 (42.95)	367.35 (40.89)	341.94 (46.88)
Four (1979)				
Reading	371.56 (52.90)	384.44 (65.81)	385.96 (69.03)	377.70 (65.31)
Language	406.17 (64.52)	432.19 (84.07)	428.68 (78.71)	417.89 (88.92)
Mathematics	370.91 (31.23)	373.19 (47.89)	392.91 (47.82)	362.11 (50.46)
n	35	36	22	27

TABLE 5

Descriptive statistics for total reading, total language and total mathematic scores on the CTBS, grades 2-5 Community B, Cohort 3, with Preschool experience and sex.

Preschool Sex	Preschool Male	Preschool Female	No Preschool Male	No Preschool Female
Grade	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)	$\bar{X}$ (S.D.)
Two (1976)				
Reading	277.31 (54.80)	302.67 (49.99)	266.45 (48.10)	277.68 (55.65)
Language	313.49 (58.56)	348.50 (55.34)	300.32 (58.07)	309.71 (60.83)
Mathematics	319.09 (39.45)	320.31 (31.06)	306.97 (33.08)	301.39 (39.86)
Three (1977)				
Reading	325.00 (56.80)	345.17 (47.39)	317.62 (35.63)	328.14 (56.68)
Language	357.54 (66.82)	390.67 (56.71)	347.24 (39.49)	359.18 (62.22)
Mathematics	349.66 (31.37)	348.88 (25.93)	332.76 (27.78)	334.29 (39.61)
Four (1978)				
Reading	359.40 (70.83)	377.29 (65.22)	330.79 (39.70)	363.86 (58.72)
Language	394.60 (77.55)	423.78 (60.63)	366.28 (51.65)	401.93 (72.42)
Mathematics	370.15 (46.37)	379.29 (35.59)	353.79 (36.71)	359.96 (47.96)
Five (1979)				
Reading	399.76 (73.83)	397.64 (61.73)	367.30 (59.54)	393.50 (69.93)
Language	419.13 (81.72)	438.49 (46.53)	403.82 (45.48)	432.61 (81.22)
Mathematics	396.83 (54.89)	418.38 (57.02)	369.96 (46.36)	399.83 (48.28)
n	25	33	23	23

Table 6: Community A, Cohort 1:

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschool, sex, and grade.

CTBS total reading scores is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,65	0.74	$p > .05$
Sex	1,65	0.01	$p > .05$
Preschool x Sex	1,65	0.33	$p > .05$
Within Subjects			
Preschool x Grade	2,64	0.66	$p > .05$
Preschool x Grade (linear)	1,65	0.21	$p > .05$
Preschool x Grade (quadratic)	1,85	1.04	$p > .05$
Sex x Grade	2,64	0.13	$p > .05$
Sex x Grade (linear)	1,65	0.04	$p > .05$
Sex x Grade (quadratic)	1,65	0.20	$p > .05$
Preschool x Sex x Grade	2,64	1.88	$p > .05$
Preschool x Sex x Grade (linear)	1,65	3.80	$p > .05$
Preschool x Sex x Grade (quadratic)	1,65	0.00	$p > .05$

Table 7: Community A, Cohort 1:

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschool, sex and grade.

CTBS total language score is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,64	0.15	p > .05
Sex	1,64	0.18	p > .05
Preschool x Sex	1,64	0.14	p > .05
Within Subjects			
Preschool x Grade	2,63	0.76	p > .05
Preschool x Grade (linear)	1,64	0.88	p > .05
Preschool x Grade (quadratic)	1,64	0.00	p > .05
Sex x Grade	2,63	1.29	p > .05
Sex x Grade (linear)	1,64	1.85	p > .05
Sex x Grade (quadratic)	1,64	2.38	p > .05
Preschool x Sex x Grade	2,63	0.61	p > .05
Preschool x Sex x Grade (linear)	1,64	0.41	p > .05
Preschool x Sex x Grade (quadratic)	1,64	0.09	p > .05

Table 8: Community A, Cohort 1:

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschool, sex and grade.

CTBS total mathematics score is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,64	0.54	p > .05
Sex	1,64	0.05	p > .05
Preschool x Sex	1,64	0.84	p > .05
Within Subjects			
Preschool x Grade	2,63	0.39	p > .05
Preschool x Grade (linear)	1,64	0.15	p > .05
Preschool x Grade (quadratic)	1,64	0.72	p > .05
Sex x Grade	2,63	4.03	p < .05*
Sex x Grade (linear)	1,64	8.15	p < .05*
Sex x Grade (quadratic)	1,64	0.37	p > .05
Preschool x Sex x Grade	2,63	0.54	p > .15
Preschool x Sex x Grade (linear)	1,64	1.08	p > .05
Preschool x Sex x Grade (quadratic)	1,64	0.01	p > .05

Table 9: Community B, Cohort 2

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschoool, sex and grade.

CTBS total reading score is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,114	0.46	$p > .05$
Sex	1,114	0.00	$p > .05$
Preschool x Sex	1,114	2.20	$p > .05$
Within Subjects			
Preschool x Grade	3,112	2.16	$p > .05$
Preschool x Grade (linear)	1,114	1.10	$p > .05$
Preschool x Grade (quadratic)	1,114	0.84	$p > .05$
Preschool x Grade (cubic)	1,114	6.16	$p > .05$
Sex x Grade	3,112	0.43	$p > .05$
Sex x Grade (linear)	1,114	0.06	$p > .05$
Sex x Grade (quadratic)	1,114	0.13	$p > .05$
Sex x Grade (cubic)	1,114	1.30	$p > .05$
Preschool x Sex x Grade	3,112	0.84	$p > .05$
Preschool x Sex x Grade (linear)	1,114	0.33	$p > .05$
Preschool x Sex x Grade (quadratic)	1,114	1.96	$p > .05$
Preschool x Sex x Grade (cubic)	1,114	1.55	$p > .05$

Table 10: Community B, Cohort 2

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschool, sex and grade.

CTBS total language score is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,115	0.00	p > .05
Sex	1,115	0.13	p > .05
Preschool x Sex	1,115	1.25	p > .05
Within Subjects			
Preschool x Grade	3,113	0.45	p > .05
Preschool x Grade (linear)	1,115	0.00	p > .05
Preschool x Grade (quadratic)	1,115	1.16	p > .05
Preschool x Grade (cubic)	1,115	0.03	p > .05
Sex x Grade	3,113	1.97	p > .05
Sex x Grade (linear)	1,115	0.13	p > .05
Sex x Grade (quadratic)	1,115	1.29	p > .05
Sex x Grade (cubic)	1,115	2.41	p > .05
Preschool x Sex x Grade	3,113	3.40	p > .05*
Preschool x Sex x Grade (linear)	1,115	5.76	p > .05*
Preschool x Sex x Grade (quadratic)	1,115	2.11	p > .05
Preschool x Sex x Grade (cubic)	1,115	0.01	p > .05

Table 11: Community B, Cohort 2:

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschool, sex and grade.

CTBS Total mathematics score is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,114	0.66	$p > .05$
Sex	1,114	1.69	$p > .05$
Preschool x Sex	1,114	2.89	$p < .09$*
Within Subjects			
Preschool x Grade	3,111	1.30	$p > .05$
Preschool x Grade (linear)	1,113	0.81	$p > .05$
Preschool x Grade (quadratic)	1,113	2.62	$p > .05$
Preschool x Grade (cubic)	1,113	0.97	$p > .05$
Sex x Grade	3,111	2.23	$p > .05$
Sex x Grade (linear)	1,113	2.49	$p > .05$
Sex x Grade (quadratic)	1,113	0.15	$p > .05$
Sex x Grade (cubic)	1,113	2.44	$p > .05$
Preschool x Sex x Grade	3,111	2.27	$p < .08$*
Preschool x Sex x Grade (linear)	1,113	4.23	$p < .05$*
Preschool x Sex x Grade (quadratic)	1,113	0.69	$p > .05$
Preschool x Sex x Grade (cubic)	1,113	0.34	$p > .05$

Table 12: Community B, Cohort 3:

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschool, sex and grade.

CTBS total reading score is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,99	1.81	p >.05
Sex	1,99	2.69	p >.05
Preschool x Sex	1,99	0.64	p >.05
Within Subjects			
Preschool x Grade	3,97	0.77	p >.05
Preschool x Grade (linear)	1,99	1.61	p >.05
Preschool x Grade (quadratic)	1,99	0.00	p >.05
Preschool x Grade (cubic)	1,99	0.76	p >.05
Sex x Grade	3,97	0.66	p >.05
Sex x Grade (linear)	1,99	0.07	p >.05
Sex x Grade (quadratic)	1,99	0.14	p >.05
Sex x Grade (cubic)	1,99	1.68	p >.05
Preschool x Sex x Grade	3,97	1.10	p >.05
Preschool x Sex x Grade (linear)	1,99	2.54	p >.05
Preschool x Sex x Grade (quadratic)	1,99	0.03	p >.05
Preschool x Sex x Grade (cubic)	1,99	0.74	p >.05

Table 13: Community B, Cohort 3:

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschool, sex and grade.

CTBS total language score is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,96	2.86	p<.09*
Sex	1,96	4.62	p<.05*
Preschool x Sex	1,96	0.01	p>.05
Within Subjects			
Preschool x Grade	3,94	1.10	p>.05
Preschool x Grade (linear)	1,96	0.07	0>.05
Preschool x Grade (quadratic)	1,96	1.72	p>.05
Preschool x Grade (cubic)	1,96	0.82	p>.05
Sex x Grade	3,94	0.11	p>.05
Sex x Grade (linear)	1,96	0.14	p>.05
Preschool x Grade (quadratic)	1,96	0.14	p>.05
Sex x Grade (quadratic)	1,96	0.03	p>.05
Sex x Grade (cubic)	1,96	0.21	p>.05
Preschool x Sex x Grade	3,94	1.08	p>.05
Preschool x Sex x Grade (linear)	1,96	2.33	p>.05
Preschool x Sex x Grade (quadratic)	1,96	1,31	p>.05
Preschool x Sex x Grade (cubic)	1,96	0.22	p>.05

Table 14: Community B, Cohort 3

Results for a Three Factor Repeated Measures MANOVA

With One Repeated Factor

Factors are preschool, sex and grade.

CTBS total mathematics score is the criterion variable.

Source	df	F	p
Between Subjects			
Preschool	1,96	4.84	$p < .05$*
Sex	1,96	0.72	$p > .05$
Preschool x Sex	1,96	0.03	$p > .05$
Within Subjects			
Preschool x Grade	3,94	1.12	$p > .05$
Preschool x Grade (linear)	1,96	2.88	$p > .05$
Preschool x Grade (quadratic)	1,96	0.70	$p > .05$
Preschool x Grade (cubic)	1,96	0.38	$p > .05$
Sex x Grade	3,94	6.68	$p < .05$*
Sex x Grade (linear)	1,96	13.25	$p < .05$*
Sex x Grade (quadratic)	1,96	6.19	$p < .05$*
Sex x Grade (Cubic)	1,96	0.31	$p > .05$
Preschool x Sex x Grade	3,94	0.14	$p > .05$
Preschool x Sex x Grade (linear)	1,96	0.23	$p > .05$
Preschool x Sex x Grade (quadratic)	1,96	0.22	$p > .05$
Preschool x Sex x Grade (cubic)	1,96	0.06	$p > .05$

Figure 1: Community A, Cohort 1
Profiles of Mean Total Reading Scores on the CTBS for
Preschool X Sex Groups.

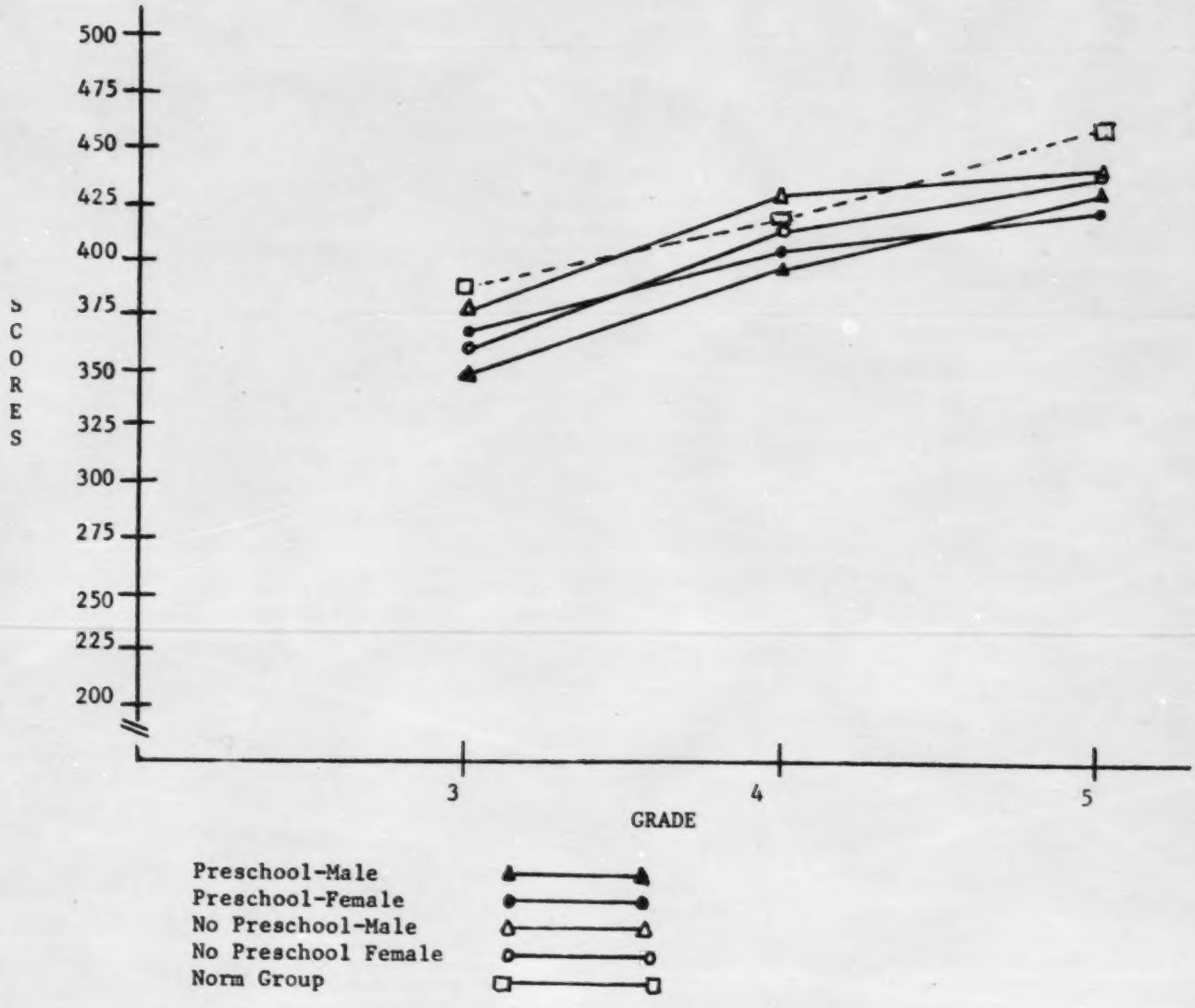

Figure 2: Community A, Cohort 1
Profiles of Mean Total Language Scores on the CTBS for
Preschool X Sex Groups.

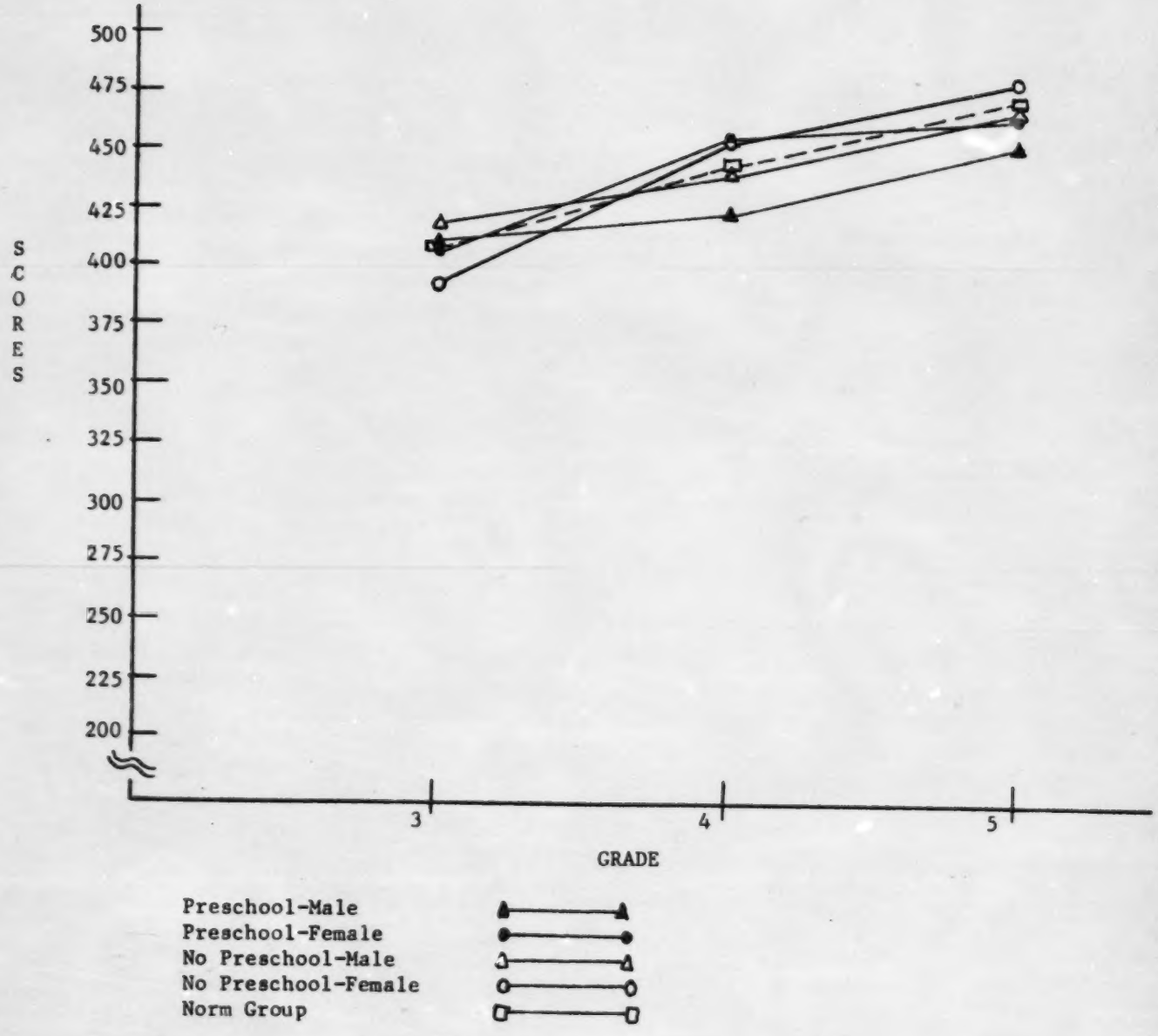

Figure 3: Community A, Cohort 1

Profile of Mean Total Math Scores on the CTBS for

Preschool X Sex Groups.

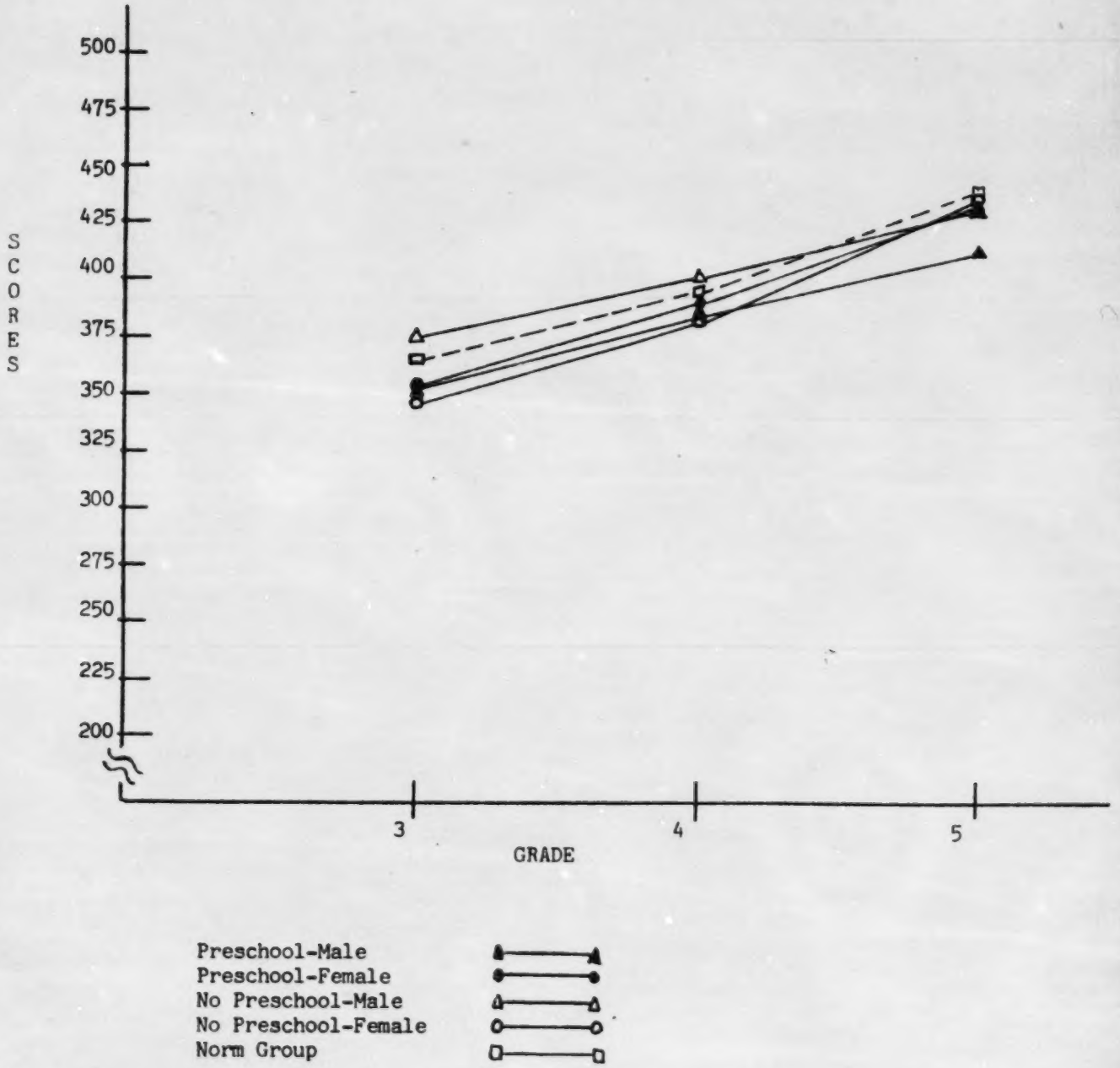

Figure 4: Community B, Cohort 2
Profile of Mean Total Reading Scores on the CTBS
for Preschool X Sex Groups

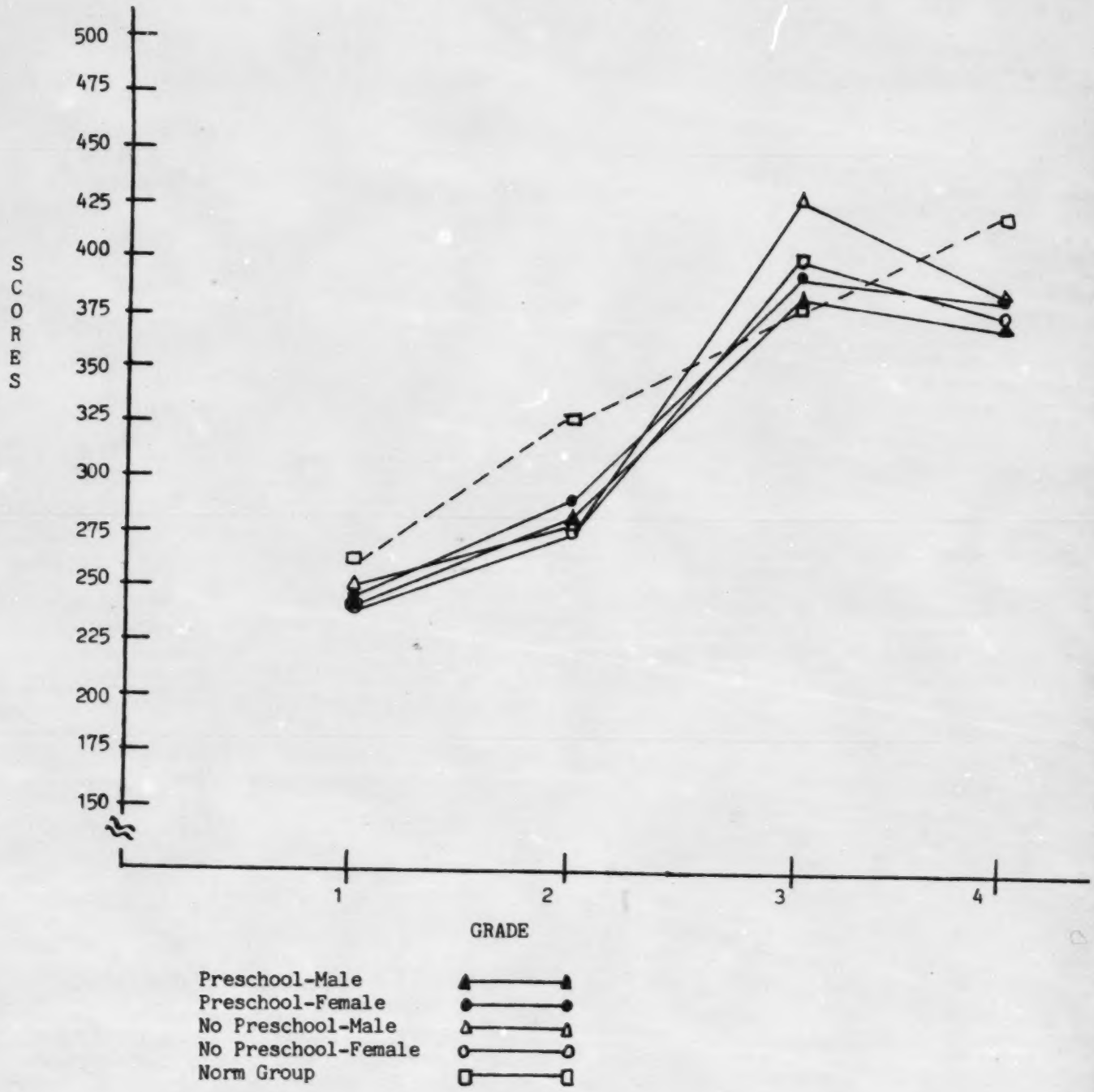

Figure 5: Community B, Cohort 2
Profile of Mean Total Language Scores on the CTBS
for Preschool X Sex Groups.

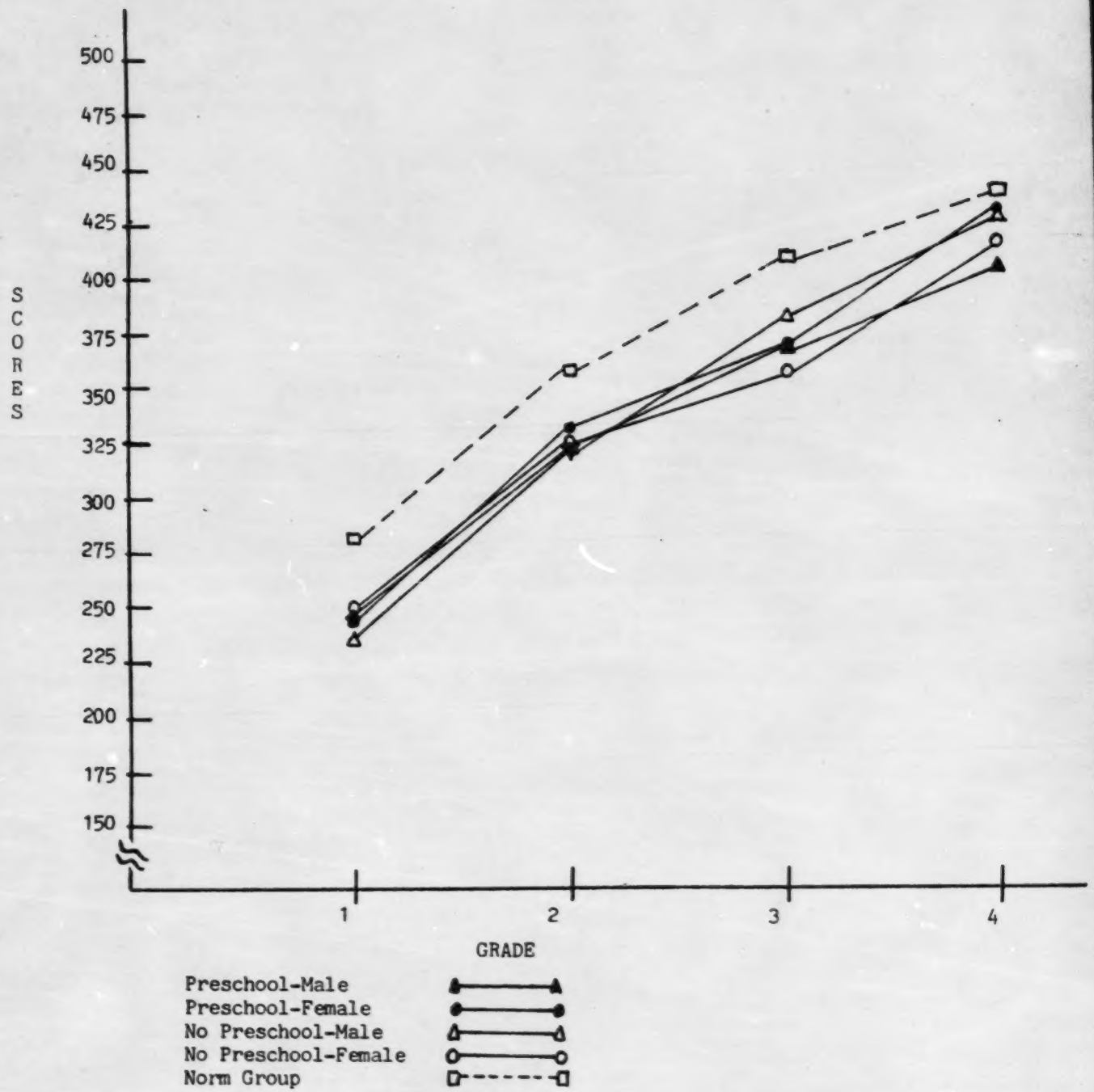

Figure 6: Community B, Cohort 2
Profile of Mean Total Math Scores on the CTBS for
Preschool X Sex Groups

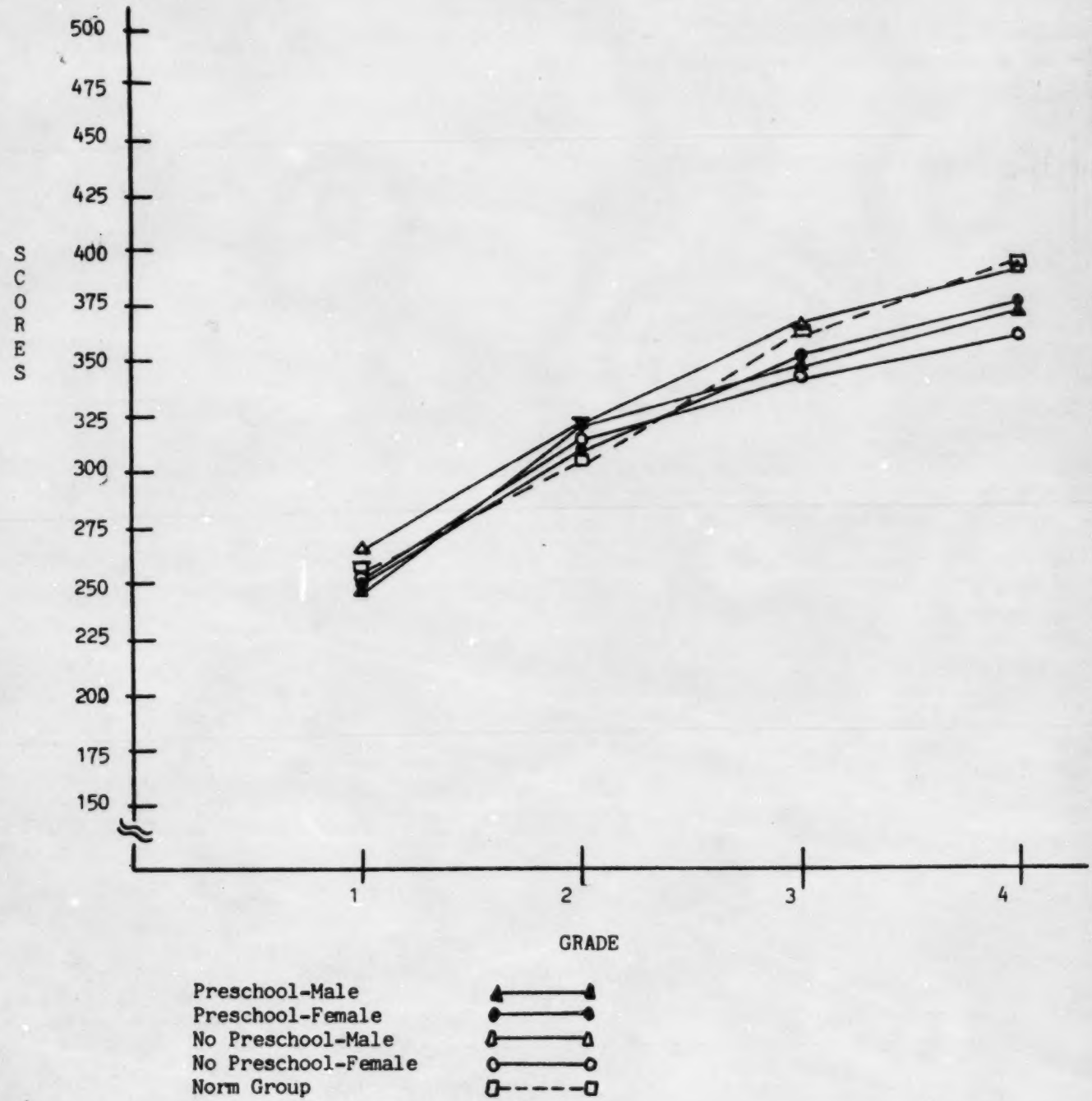

Figure 7: Community B, Cohort 3
Profile of Mean Total Reading Scores on the CTBS
for Preschool X Sex Groups

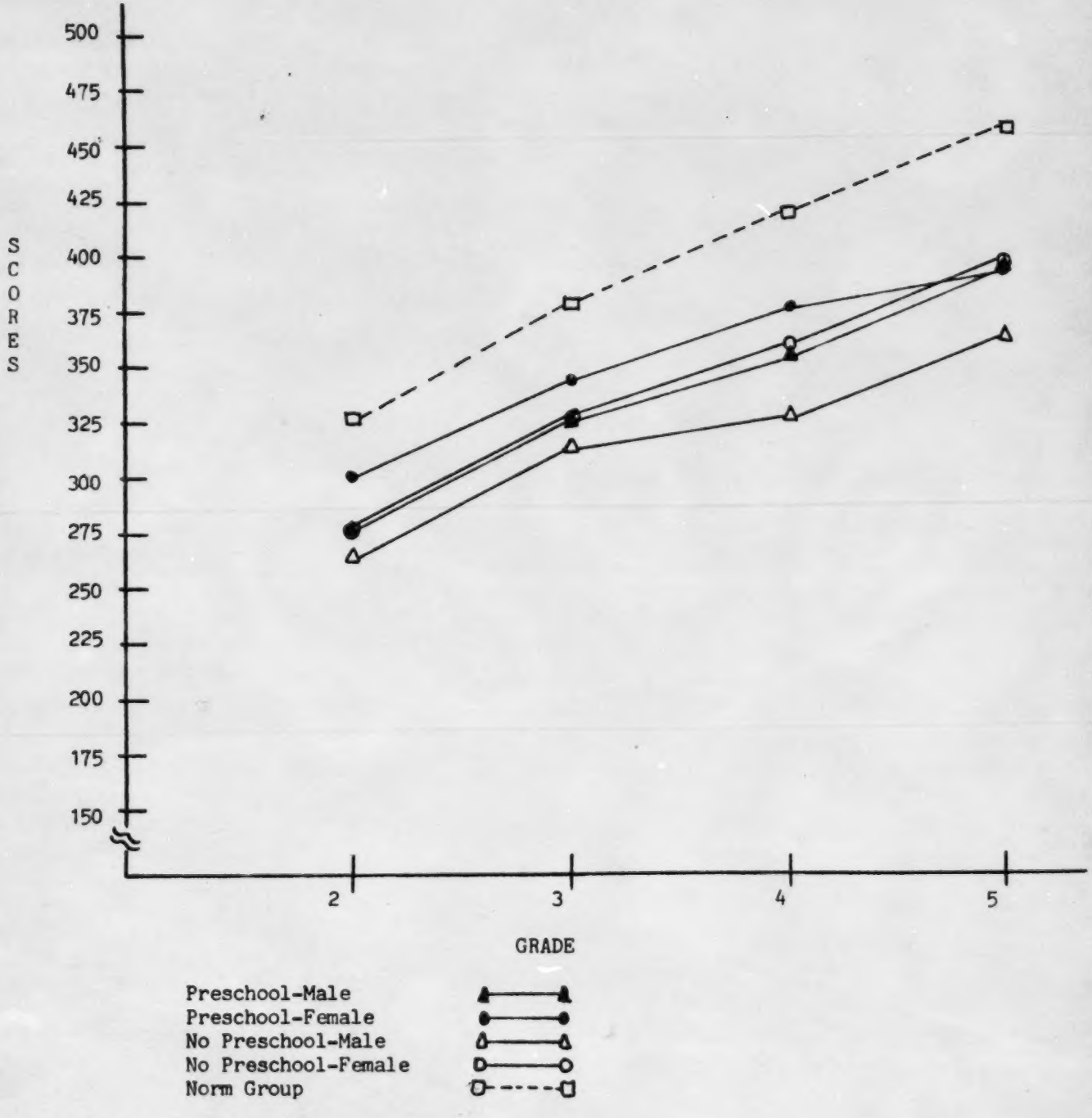

Figure 8: Community B, Cohort 3
Profile of Mean Total Language Scores on the CTBS
for Preschool X Sex Groups

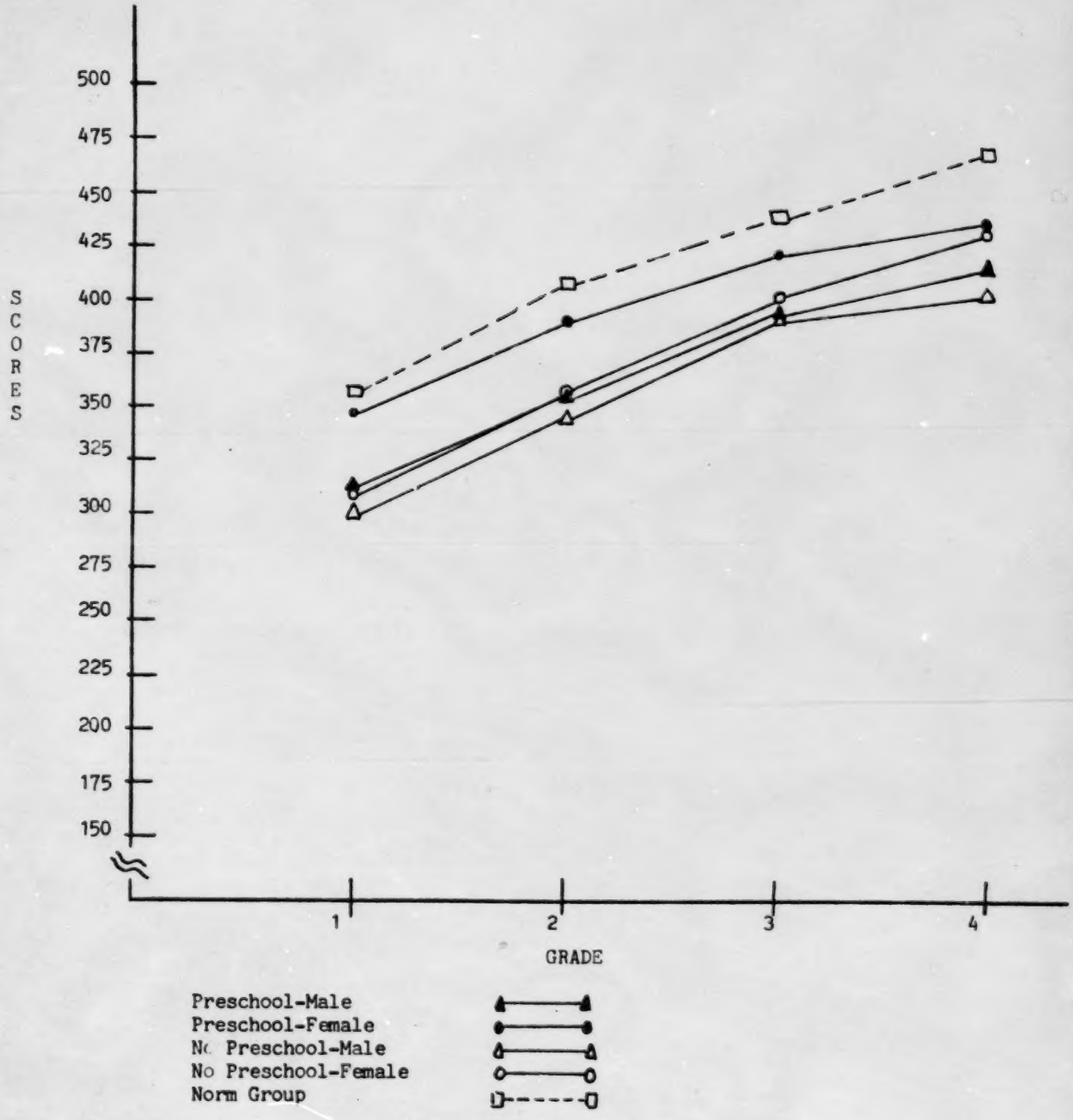

Figure 9: Community B, Cohort 3
Profile of Mean Total Math Scores on the CTBS
for Preschool X Sex Groups